REMARKS

This paper is being provided in response to the April 22, 2004 Office Action for the above-referenced application. In this response, Applicants have cancelled claim 12 without prejudice or disclaimer of the subject matter thereof, amended claims 1, 5, 6, 8, 13, 14 and 25-28, and added claims 29-36 in order to clarify that which Applicants consider to be the invention. Applicants have also amended the specification for clarification purposes to describe what is already shown in originally-file Fig. 2 of the application. Applicants respectfully submit that the amendments to the claims and the new claims are fully supported by the originally-filed application and that the changes to the specification do not add new matter.

The objection to the specification has been addressed by amendments contained herein. Accordingly, Applicants respectfully request that this objection be withdrawn.

The various objections to the claims have been addressed by amendments to the claims contained herein. Accordingly, Applicants respectfully request that these objections be withdrawn.

The rejections of claims 8, 9 and 25-28 under 35 U.S.C 112, fist paragraph, has been addressed by amendments to the claims contained herein. Accordingly, Applicants respectfully request that this rejection be withdrawn.

The rejection of claims 1, 2, 5, 6, and 8 under 35 U.S.C. 102 as being anticipated by U.S. Patent No. 6,122,027 to Ogawa et al. (hereinafter "Ogawa") is hereby traversed and

reconsideration is respectfully requested in view of the amendments to the claims contained herein.

Independent claim 1, as amended herein, recites a reflection type liquid crystal display that includes a pair of substrates disposed opposite to each other with a liquid crystal layer disposed therebetween, a first substrate area formed using rough portions on a portion of one surface of at least one of said pair of substrates, where the one of at least one of said pair of substrates also has a second substrate area that is relatively smooth, a plurality of switching elements formed on the second substrate area, a reflective layer constituted of a same material as a material constituting a gate electrode of said plurality of switching elements and simultaneously formed on the first substrate area during formation of the gate electrode of the plurality of switching elements on a same plane as a plane of said gate electrode, a transparent pixel electrode formed on the reflective layer via an insulation layer and connected to an electrode included in the plurality of switching elements, and a color filter layer disposed between the reflective layer and the transparent pixel electrode. Claims 2, 5, 6, and 8 depend directly or indirectly on independent claim 1.

Ogawa discloses a reflective liquid crystal display device that includes a substrate (101), a transparent substrate (108) facing the substrate (101), and a liquid crystal layer (106) sandwiched between the substrate (101) and the transparent substrate (108). Ogawa discloses that the liquid crystal display device also includes a first transparent electrode (105), an electrically insulating separating layer, and a reflective film (102) formed in that order from the liquid crystal layer side at the inward-facing surface of the substrate. Ogawa's device is also

disclosed as including a second transparent electrode (107) included in the inward-facing surface of the transparent substrate (108). Ogawa shows the substrate (101) and reflective film (102) formed thereon as being flat (see Figure 8 of Ogawa).

Applicants respectfully submit that Ogawa does not show, teach, or suggest the features of the present claimed invention where a substrate has a first substrate area formed using rough portions and a second substrate area that is relatively smooth where a reflective layer is formed on the first substrate area and where the gate of the switching element is formed on the second substrate area and where the reflection layer and the gate are formed in the same plane. Instead, Ogawa appears to disclose an entirely flat substrate (101) not having any rough portions where both the switching elements and the reflective layers are formed on the entirely flat substrate. In addition, Ogawa does not appear to disclose any motivation to provide anything other than the disclosed flat substrate. Accordingly, Applicants respectfully request that this rejection be withdrawn.

The rejection of claim 9 under 35 U.S.C. 103(a) as being unpatentable over Ogawa in view of U.S. Patent No. 5,811,835 to Seiki (hereinafter "Seiki") is hereby traversed and reconsideration is respectfully requested in view of the amendments to the claims contained herein.

Claim 9 depends from independent claim 1, discussed above. Ogawa is also discussed above. Seiki is apparently relied upon in the Office Action for teaching the use of alloy of aluminum and neodymium as recited in claim 9.

Applicants respectfully submit that the deficiencies of the Ogawa reference with respect to claim 1, discussed above, are not overcome by the addition of the Seiki reference and that therefore claim 9 is patentable over Ogawa and Seiki, taken alone or in any combination. Accordingly, Applicants respectfully request that this rejection be withdrawn.

The rejection of claims 12, 25, and 26 under 35 U.S.C. 103(a) as being unpatentable over Ogawa in view of U.S. Patent No. 5,940,154 to Ukita (hereinafter "Ukita") is hereby traversed and reconsideration is respectfully requested in view of the amendments to the claims contained herein.

Claim 12 depends from independent claim 1, discussed above.

Claim 25, as amended herein, recites a reflection type liquid crystal display that includes a pair of substrates disposed opposite to each other via a liquid crystal layer, a first substrate area formed using rough portions on a portion of one surface of at least one of the pair of substrates, where the one of at least one of the pair of substrates also has a second substrate area that is relatively smooth, a plurality of switching elements formed on said second substrate area, a reflective layer simultaneously formed on the first substrate area during formation of gates of said switching elements, a transparent pixel electrode formed on the reflective layer via an insulation layer and connected to one electrode constituting one of the switching elements; and a color filter layer disposed between the reflective layer and the transparent pixel electrode, where each of the plurality of switching elements is a thin film transistor, and the reflective layer is

formed of the same material as a material of a gate electrode of the thin film transistor and constituted on the same plane as a plane of the gate electrode.

Claim 26, as amended herein, recites a reflection type liquid crystal display that includes a pair of substrates disposed opposite to each other via a liquid crystal layer, a first substrate area formed using rough portions on a portion of one surface of at least one of the pair of substrates, where the one of at least one of the pair of substrates also has a second substrate area that is relatively smooth, a plurality of switching elements formed on the second substrate area, a reflective layer simultaneously formed on the first substrate area during formation of gates of the switching elements, a transparent pixel electrode formed on the reflective layer via an insulation layer and connected to one electrode constituting one of the switching elements, and a color filter layer disposed between the reflective layer and the transparent pixel electrode, where the thin film transistor comprises a gate electrode electrically connected to a scanning line, a gate insulation film formed to cover the gate electrode, a semiconductor layer formed on the gate insulation film, a drain electrode electrically connected to a signal line, and a source electrode electrically connected to the transparent pixel electrode, and where the reflective layer is electrically separated from the gate electrode and is formed of a same material as a material of the gate electrode and formed on a same plane as a plane of the gate electrode.

The Ogawa reference is discussed above.

The Ukita reference discloses a reflection type liquid crystal display device utilizing a staggered type transistor. A rough insulating substrate 1 has a reflection plate 2 formed thereon.

A transparent dielectric film 3 is then formed on the reflection film and a thin film transistor 20, which is used as a switching element, is formed on the transparent dielectric film 3.

Applicants respectfully submit that neither Ogawa, Ukita, nor any combination thereof show, teach, or suggest the features recited in Applicants' independent claims where a substrate has a first substrate area formed using rough portions and a second substrate area that is relatively smooth where a reflective layer is formed on the first substrate area and where the gate of the switching element is formed on the second substrate area and where the reflection layer and the gate are formed in the same plane. As discussed above, Ogawa teaches the use of an entirely flat substrate for both the switching element and the reflective layer. In Ukita, on the other hand, the rough portions are formed on the entire surface of the substrate and thus Ukita does not show, teach, or suggest the recited smooth second area of the substrate. Instead, Ukita provides a transparent dielectric layer 3 on which to form the switching element 20. However, this does not allow Ukita to form the gate of the switching element on the same plane as the reflection layer, as recited in all of Applicants' independent claims. The advantages of being able to place the gate and the reflection layer on the same plane, as recited in all of Applicants' claims, are set forth in the present specification.

Furthermore, Applicants respectfully submit that one of ordinary skill in the art, combining Ogawa and Ukita, would not provide the present claimed invention. In the first place, neither reference, alone or in any combination, sets forth any teaching or motivation to provide the recited two substrate areas: a rough area for the reflection plate and a smooth area for the switching element. Ogawa teaches a uniformly smooth substrate while Ukita teaches a

uniformly rough substrate. There is no teaching or motivation in either reference, alone or in combination, to provide both a smooth area and a rough area as recited in the claims.

In addition, even if one were to attempt to use the rough substrate of Ukita to provide both the reflection layer and the gate of the switching element in the same plane (as recited in Applicants' claims), then the gate would be formed on rough portions of the substrate. Applicants respectfully submit that such a configuration is inoperative, and thus may not be used to reject Applicants' claims. Said differently, modifying Ukita to attempt to construct the gate on the same plane as the reflection layer (as recited in Applicants' claims) would result in an inoperative device and thus such a suggested modification to Ukita may not be used to reject Applicants claims. It is further noted that modifying Ogawa by providing the entirely roughened substrate as taught by Ukita is subject to a similar constraint.

Accordingly, based on the above, Applicants respectfully request that this rejection be withdrawn.

The rejection of claims 13, 14, 27, and 28 under 35 U.S.C. 103(a) as being unpatentable over Ogawa in view of Ukita and further in view of U.S. Patent No. 5,610,741 to Kimura (hereinafter "Kimura") is hereby traversed and reconsideration is respectfully requested in view of the amendments to the claims contained herein.

Claims 13 and 14 depend from claim 1, discussed above.

Claim 27, as amended herein, recites a reflection type liquid crystal display that includes a pair of substrates disposed opposite to each other with a liquid crystal layer disposed therebetween, a first substrate area formed using rough portions on a portion of one surface of at least one of the pair of substrates, where the one of at least one of the pair of substrates also has a second substrate area that is relatively smooth, a plurality of switching elements formed on the second substrate area, a reflective layer constituted of a same material as a material constituting a gate electrode of one of the plurality of switching elements and formed on the first substrate area on a same plane as a plane of said gate electrode, a transparent pixel electrode formed on the reflective layer via an insulation layer and connected to an electrode included in the plurality of switching elements, a color filter layer disposed between the reflective layer and the transparent pixel electrode, and wherein the rough portions are formed of a material which is not deformed in a heating process performed later and which does not contain high density impurities adversely affecting the liquid crystal display.

Claim 28, as amended herein, recites a reflection type liquid crystal display that includes a pair of substrates disposed opposite to each other with a liquid crystal layer disposed therebetween, a first substrate area formed using rough portions on a portion of one surface of at least one of the pair of substrates, where the one of at least one of the pair of substrates also has a second substrate area that is relatively smooth, a plurality of switching elements formed on the second substrate area, a reflective layer constituted of a same material as a material constituting a gate electrode of one of the plurality of switching elements and formed on the first substrate area on a same plane as a plane of said gate electrode, a transparent pixel electrode formed on the reflective layer via an insulation layer and connected to an electrode included in the plurality of

switching elements, a color filter layer disposed between the reflective layer and the transparent pixel electrode, and wherein the rough portions are formed by forming an insulation film and patterning the insulation film.

The Ogawa and Ukita references are discussed above.

The Kimura reference discloses a reflection type liquid crystal display device with bumps on the reflector. The Office Action cites Kimura as disclosing the patterning of an insulation film to form rough portions on a surface of a substrate below a reflective layer.

Applicants respectfully submit that Kimura fails to overcome the above noted deficiencies of Ogawa and Ukita with respect to Applicants' claims. Specifically, Applicants respectfully submit that neither Ogawa, Ukita, nor Kimura, taken alone or in any combination, teach or fairly suggest at least the recited feature where a substrate has a first substrate area formed using rough portions and a second substrate area that is relatively smooth where a reflective layer is formed on the first substrate area and the gate of the switching element is formed on the second substrate area and where the reflection layer and the gate are formed in the same plane. As discussed above, Ogawa teaches the use of an entirely flat substrate for both the switching element and the reflective layer while, in Ukita, the rough portions are formed on the entire surface of the substrate.

All of Applicants' independent claims specifically recite that the reflection layer and the gate of the switching elements being formed in the same plane. The advantages of this

arrangement are discussed in the present application. In contrast, Kimura, like Ukita, shows the reflection layer being provided on a different plane that the gate of the switching element. Thus, Applicants respectfully submit that the addition of the Kimura reference does not overcome the deficiencies of the combination of Ogawa and Ukita, discussed above. Accordingly, Applicants respectfully request that this rejection be reconsidered and withdrawn.

The present claimed invention provides a high-luminance reflection-type liquid crystal display without any mirroring phenomenon. None of the cited references, alone or in any combination, show, teach, or suggest the claimed invention.

Based on the above, applicant respectfully requests that the Examiner reconsider and withdraw all outstanding rejections and objections. Favorable consideration and allowance are earnestly solicited. Should there be any questions after reviewing this paper, the Examiner is invited to contact the undersigned at 617-248-4038.

Respectfully submitted,
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Date: September 22, 2004

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